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Telecommunications Sector Reforms in Senegal

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Abstract

This paper analyzes Senegal's experience with telecommunications liberalization and privatization. Senegal privatized its incumbent operator in 1997, and granted the newly privatized firm seven years of fixed-line exclusivity while introducing "managed competition" in the cellular market and free competition in value-added services (VAS). By May 2001, two cellular operators, a number of VAS providers, and thousands of retailers operating telecenters had entered the market. Reform has thus significantly changed the landscape of Senegal's telecommunications sector and has brought with it tremendous improvement in sector performance. Between 1997 and 2001, fixed-line telephone penetration grew from 1.32 to 2.45 per hundred people, while mobile penetration skyrocketed from 0.08 to 4.04. But it is still too early to assess the validity of granting fixed-line exclusivity to the incumbent operator. While penetration increased, the operator did not meet objectives regarding rural telephony. Moreover, fixed-line penetration increased in areas where the operator faced competition from a mobile provider.

This paper—a product of Regulation and Competition Policy, Development Research Group—is part of a larger effort in the group to promote telecommunications competition, liberalization, and privatization in Africa. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Paulina Sintim-Aboagye, room MC3-422, telephone 202-473-8526, fax 202-522-1155, email address psintimaboagye@worldbank.org. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. Jean-Paul Azam may be contacted at azam@univ_tlse.fr. September 2002. (47 pages)

Telecommunications Sector Reforms in Sénégal*

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1. Introduction

The privatization process that took place in the telecom sector in Sénégal in 1995-96 was the response of the government to the increased competition expected to result from the development of the information technology. By anticipating the potential shock from large-scale data processing firms, the government sought to keep its national company alive, with its staff and other stake-holders.

This process was triggered by a report estimating the gains to the various stake-holders, the state, the Sonatel company (the state-owned operator), its staff, and the users. A striking fact came out of that study, namely that 80 % of the turnover of the state-owned telecom operator was made with local subsidiaries of multinational companies, and was therefore under the potential competition of the big international data processors, like SITA or British Telecom. Much more than the local firms or the household sector, it was believed that these customers were in a position to switch to this technology, were the telecom sector to fail to deliver the required telecommunication services. It was thought that no acceptable regulation could circumvent this potential competition, as the monopoly on data processing would have to go, if the pressures on the government by the multinational firms were to become too strong, as a response to Sonatel failing to face up to their needs. Moreover, as the Senegalese government was starting new programs with the World Bank, in the wake of the January 1994 devaluation of the CFA F, and in particular a private sector support program presented to the Board in February 1995, its position was not very strong for resisting pressures in favor of liberalization. The need was then felt to attract a strategic partner in order to keep Sonatel going, by improving the management of the enterprise, and by stepping up technical innovation, in order to keep the firm abreast with potential competition. Then, a partial privatization of Sonatel was effected, with France Telecom taking over 33 % of the shares. So far, Sonatel has kept the monopoly over large-scale data processing. Moreover, some liberalization took place in the mobile telephone sector, where two firms were allowed to operate, one of them being a subsidiary of Sonatel.

In addition, the study also showed that the state was a bad partner, not only as a dangerous share-holder, able to siphon-off some of the cash-flow, directly by soaking up the

profits, or in a more sneaky way, as a bad customer, by accumulating arrears on its payments due. The government was also in a position to use this, and other, state-owned enterprises to sidestep the credit ceilings inherent to the participation in the CFA Zone : while Sonatel was paying immediately all its due to the state, the latter could obtain commercial credit on its own payments to the former. This process was creating a strain on the company's finances, thereby threatening its survival, while undermining the credibility of the government's resolve to get on with the macro-economic adjustment program. Nowadays, the state only owns 33 % of the shares, with no more power in the board than the strategic partner, France Telecom.

The present paper describes the reforms that took place in the telecom sector of Sénégal in two steps. The first one was the 1985 reform, when Sonatel was created, a parastatal with monopoly right on telecommunication. It resulted from the restructuring of the sector, where the "Office des Postes et des Télécommunications" (OPT) (Post and Telecommunication Office)[1] was previously in charge of both the post office and the local telephone operation. Another operator was then in charge of international telecommunications. It is shown that this reform was a relative success, at least on a "before-after" basis. Then, in section 3, it describes the positions of the various actors during the process that led to the privatization of Sonatel. It analyses the explicit motivations of the government, as well as the political circumstances that favored the adoption of the privatization-cum-liberalization program. The subsequent section presents the privatization process, describing how France Telecom eventually entered the scene. Section 5 then provides a preliminary assessment of the impact of the reform, and describes the new setting that governs the functioning of the Telecommunication sector in Sénégal. The events of October 2000, when the license of one of the mobile telephone operators (Sentel) was withdrawn are discussed at length, as they shed some light on the uncertainty surrounding the enforcement of the agreed rules of the game between the state and the private operators. They raise the same conceptual issue of the difficult enforcement of a contract with a sovereign entity as did the debt crisis of the 1980s.

2. Initial Situation and the 1985 Reform

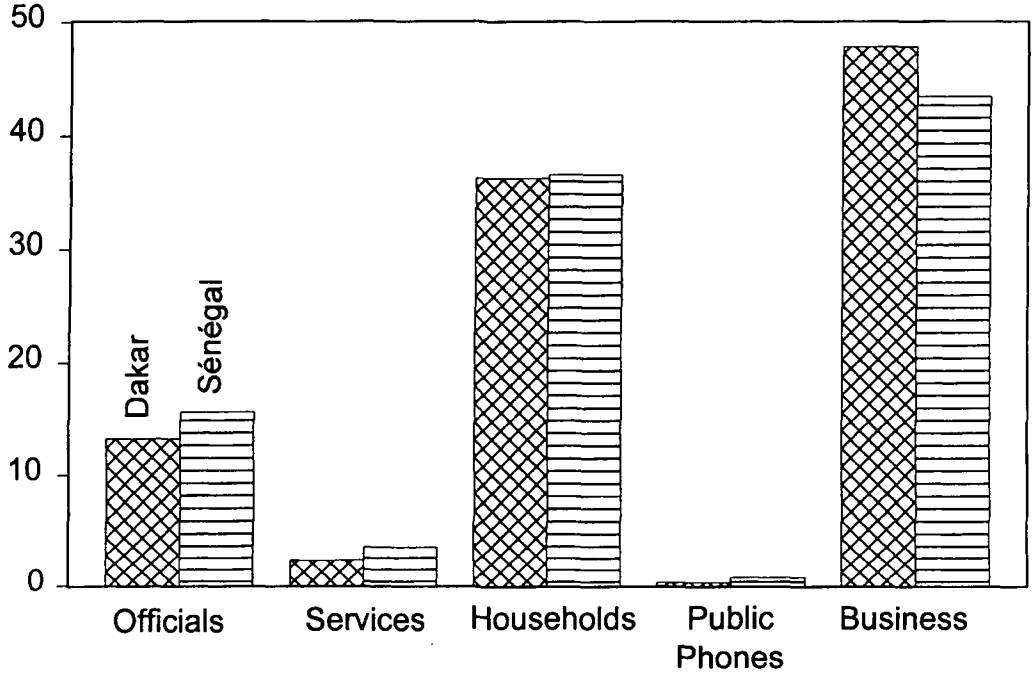
The liberalization policy of the 1990s had been preceded in the 1980s by some drastic restructuring. The national company Sonatel was created in 1985, with a view to improve the quality of service delivered previously. On a 'before-after' basis, this move turned out to be quite a success, but if one takes best-practice technology as the counter-factual, then Sonatel was still lagging behind.

The State of Telecommunications Before Sonatel

In the early 1980s, the management of telecommunications in Sénégal was performed by two separate bodies. The Post and Telecommunications Office (OPT) was in charge of domestic telecommunications, while Télésénégal was in charge of international telecommunications. The OPT was also running a savings bank. The domestic network had a very weak infrastructure, and was delivering a very poor service. There were about 20 000 lines, mainly in the Dakar area, amounting to about 3 lines per 1000 inhabitant. This rate is comparable to the Sub-Saharan African performance of the time, but lies well below international standards. The excess demand pressure was correspondingly strong, as about 50% of the demanders were not served, with an average waiting time of four years before being connected to the network. The interior of the country, and especially the rural areas, were almost entirely excluded from the network. While the whole country was covered by 22 163 lines, about two-thirds of them (14 774) where located in Dakar. Notice that, by African standards, Sénégal is a highly urbanized country, with about 38 % of its population in the urban sector in 1985 and 42 % in 1995. Chart 1 represents the percentage of each user type in the total number of lines. Quite predictably, the percentage of businesses is larger in Dakar than in the country as a whole.

The poor quality of the service is illustrated by the fact that, for example, more than half of the network was out of order during the whole rainy season. The percentage of declared breakdowns per year reached 200 % of the lines in 1984, a drought year, only 65 % of them being repaired within a week. The rate of successful calls was very low, reaching 47 % for local calls, and 25 % only for inter-city calls. This was a strain on the firms, which accounted for a large share of the clients, as seen from chart 1.

Chart 1 : Percentage of Lines per User Type (1985)



Note : Total = 14 774 for Dakar (66 %) and 22 163 for the whole of Sénégal.

The bad quality of service was not related to any staff shortage, as the total number of employees was about 2000 agents, each one of them thus being on average in charge of about 10 lines. On October 1, 1985, the ratio of manpower to main lines (times 1000) was 92.3, a number that fell regularly ever since.

The payment recovery rate was low, mainly because the government and the public sector were not paying their bills, while the accounts of the other clients were badly kept. An internal Sonatel report dated 1985, showed that only 30 % of the bills were paid within the legal delay of 30 days, while 55 % were paid within 60 days. The level of unpaid bills was equivalent to 7 months of total consumption as of May 31, 1985. Half of these arrears were on account of the state. The treasury's debt to Sonatel was CFA F 3.7 billion at that date. The main cause of these arrears for the other half was claimed in this report to be the lack of a computerized client file. For example, a survey performed by an independent audit firm

showed that 30 % of the sums reclaimed from clients had already been paid, while a lot of unpaid ones were never reclaimed. However, the same report asserted that the second cause of the large amount of unpaid bills was "the tolerance granted to some customers, due in part to their network of influence".

Moreover, the tariff structure was perceived to cause distortions. For international calls, it was much cheaper to call Dakar than to call from Dakar, so that many customers, including subsidiaries of multinational firms were substituting the former to the latter. For example, in May 1985, the cost per minute of a Dakar-Paris call was CFA F 990 versus CFA F 828 in the other direction, during the day, while the night tariff from Paris was CFA F 571. The cost of the Dakar-New York call was CFA F 1650, while the call in the other direction was CFA F 1190. This cost difference was not uniform, and was in the opposite direction for many African destinations. For example, regarding the calls to or from Abidjan, the outward call cost was CFA F 464, while the inward call cost was CFA F 535 (Babin, 1986).

The base tax was high by any standards. It was CFA F 62 in Sénégal, against 38.5 in France, 39 in Belgium, 43 in Italy, 20 in Switzerland, and 60 in Mali, 36 in Cameroon, 50 in Togo, 55 in Niger and 58 in Côte d'Ivoire (Babin, 1986). However, the tariff structure did not correspond precisely to the cost structure, so that various implicit cross subsidies were present, generally in favor of local calls by households. Because of the state of excess demand, the demand by businesses was relatively price inelastic, so that the charges for international calls and inter-city calls had been set much above their cost, the proceeds being used implicitly to subsidize local calls by households, mainly in Dakar (Babin, 1986). However, the response by the firms, although relatively inelastic, was perceived to display some traffic diversion, as firms were using various methods to substitute for expensive international calls.

Democratization and the Path to Reform

The 1980s have witnessed a process of democratization in Sénégal, after Abdou Diouf replaced the president and poet Leopold Sedar Senghor, who resigned at the end of 1980. Diouf, who had been the undisputed *Dauphin* for about 10 years (Ka and Van de Walle, 1994), was representing a young generation of technocrats trained in France, willing to reform the economy and the polity after the crisis of the late 1970s, when a drought combined with

the end of the groundnut and phosphates boom (Azam and Chambas, 1999) to shock the economy into a deep crisis. The government budget deficit reached about 9.3 % of GDP in 1981, while its twin deficit, the current account, went up to about 20 % of GDP. President Diouf believed that a democratization process would help him overcome the opposition of the old 'barons' of the ruling party, then renamed the Socialist Party, who had a stake in the continuation of the previous clientelist regime. Nevertheless, by African standards, Sénégal was already quite a democratic country, with four parties allowed to run for elections. All legal restrictions on political parties were removed, and a dozen new ones were then created (Ka and Van de Walle, 1994). At both the 1978 and the 1983 elections, the Senegalese Democratic Party led by the attorney Abdoulaye Wade gained about a fifth of the votes. The Senegalese system is a rather presidential one, with the president being elected by a French-style two-round direct election system, where absolute majority is required to win at the first-round, while the parliament is composed by half of MPs elected under a proportional system, while the other half is elected by a winner-take-all system at the department level. Elections take place every five years.

In mid-1984, the president announced a new 'Medium and Long Term Adjustment plan', and closed the position of the Prime Minister, which was his before 1980, in order to 'lessen the number of intermediaries' (Ka and Van de Walle, 1994, p.311). He also replaced most of the old 'barons' by younger technocrats, thus signaling his plan to escape from the burden of the ruling party, and to base his action on the support of a strong civil service. His government adopted a standard adjustment package, including a stabilization side, and a structural adjustment side. The latter included a new agricultural policy, a new industrial policy, and a trade liberalization package. After a slow start, the reform process took some momentum at the turn of the decade (Rouis, 1994). However, the public enterprise reform was widely regarded as the fastest on track (Ka and Van de Walle, 1994). The restructuring of the telecom sector took place within this framework.

The 1985 Reform

In 1985, after consulting with the main actors of the sector, the government decided to merge the domestic telecommunications with the international ones, creating the national company Sonatel, and to separate it from the post office. Sonatel is then endowed with the monopoly right over telecommunications in Sénégal. A large autonomy of management is allocated to this new parastatal by the government, while a list of objectives is specified in a "contrat-plan" (medium-term contract), bearing in particular on the extension of the network and the quality of the service. More precisely, the contract was signed for a period of three years, starting on July 1, 1986. Five strategic objectives were assigned to Sonatel :

(a) Improve rapidly and durably the quality of service offered to the customers in Dakar ;

(b) achieve a set of investment projects, during the agreed period ;

(c) use at best the human resources available within the firm ;

(d) give in due course an easy access to the telephone to each Senegalese citizen ;

(e) improve the brand image of Telecommunications.

The first and third objectives say a lot about the political economy of this reform, where the government is trying to strike a delicate balance between the satisfaction of the urban voters, as Dakar is the most important constituency to keep satisfied, without doing any harm to the employees of Sonatel, whose political influence far exceeds their numerical importance, in particular through their representative trade union. Their political leverage can be explained *à la* Olson (1965), as their small number makes them easy to organize, while if they go on strike, the resulting disruption in telecommunication affects directly the resident firms and that small fraction of the population which is connected to the network, mainly drawn from the richest tail of the income distribution. Article 4 of the contract, which aims at giving more precision to the stated objectives, makes clear that the reform has a definitely conservative goal. It says : "While trying by an ambitious development program [...] to respond to the demand for new main lines, Sonatel gives priority to the improvement of the service currently offered to users". Article 5 hammers the point further by emphasizing the need to improve "the quality of the service of the Dakar network (representing 70 % of the

clients and more than 80 % of the revenues) ...". Among the performance criteria assigned to Sonatel, article 10 specifies that the staff must remain constant, at 2030 employees, while allowing for an increase in the wage bill by up to 10 % per year. Article 12 gave point (b) a precise content. The stated objective was to expand modestly the number of main lines from 21 820 on the June 30, 1985 to 27 210 on the June 30, 1989. A quick glance at table 1 below shows that this objective has been exceeded by a factor of two. Many other performance criteria were specified, explicitly targeted at improving the satisfaction of the initial customers, rather than at increasing the coverage of the country. All this reflects the weak political position of the government in the negotiation of this contract relative to the politically active urban population.

Network Expansion

After ten years of operations, the record of Sonatel seemed quite positive. The number of main lines had been multiplied by 3, from 25 000 to 75 000, or about 13 % per year, reaching a density of about 9 lines per 1 000 inhabitants. Table 1 describes the evolution of the network over the years, while chart 2 depicts the expansion of the number of installed lines per one thousand inhabitants, showing that the number of installed lines kept well ahead of the rapid population growth. The number of utilized main lines reached 110 000 in October 1997. The network growth was thus exponential during the days of the Sonatel public monopoly. The density of telephone lines reached 13 lines per 1000 inhabitants, the highest performance in ECOWAS. Notice that the utilization rate, represented in the last column of table 1, fluctuates roughly between 2/3 and ¾ , which does not signal any waste, in a rapidly expanding network.

For the sake of comparison, during the same period, the extension of the network was slower in Côte d'Ivoire, increasing by a factor of about 2.5, or about 10 % per year, starting however from a better initial situation. The capacity of the central switchboards was also increased, from 33 000 to 114 093 lines. Moreover, the relative importance of households and businesses has been reversed, with the share of businesses accounting only for 24 %.

Table 1 : Network Expansion (1985-1996)

	Installed Lines	Growth (%)	Used Lines	Growth	Utilization Rate (%)
1985	33 097	0.4	22 163	5.1	67
1986	33 411	0.9	23 586	6.4	70.6
1987	34 287	2.6	26 548	12.6	77.4
1988	37 464	9.2	28 933	9	77.2
1989	64 364	71.8	36 166	25	56.2
1990	63 177	-1.8	40 413	11.7	64
1991	76 972	21.8	48 469	19.9	63
1992	86 990	13	58 095	19.9	66.8
1993	91 951	5.7	64 055	10.3	69.7
1994	105 180	14.4	75 024	12.4	68.5
1995	114 093	8.5	81 988	13.8	71.9
1996	133 446	17	95 063	15.9	71.2

Source : Sonatel, 28 October 1997.

Chart 2 : Network Expansion (1985-1996)

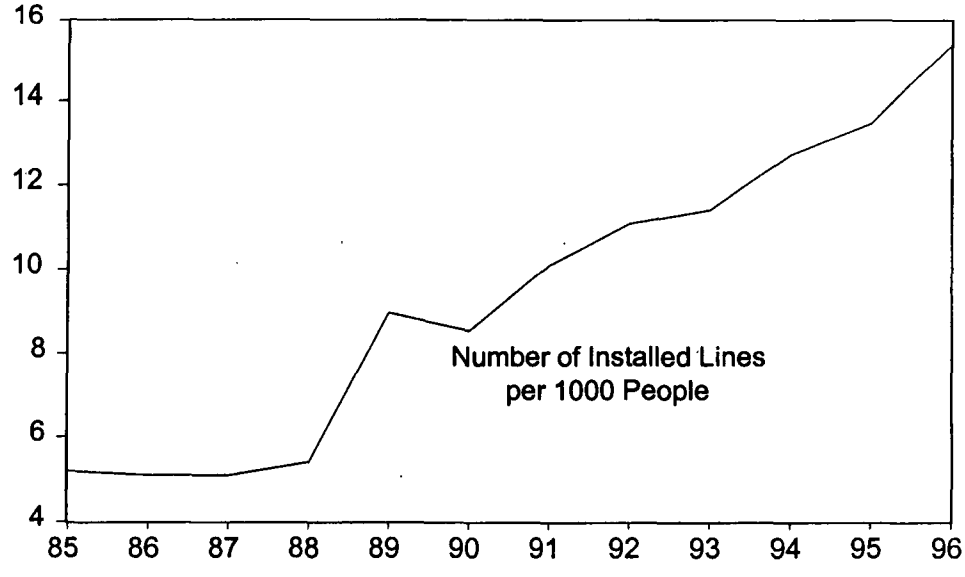


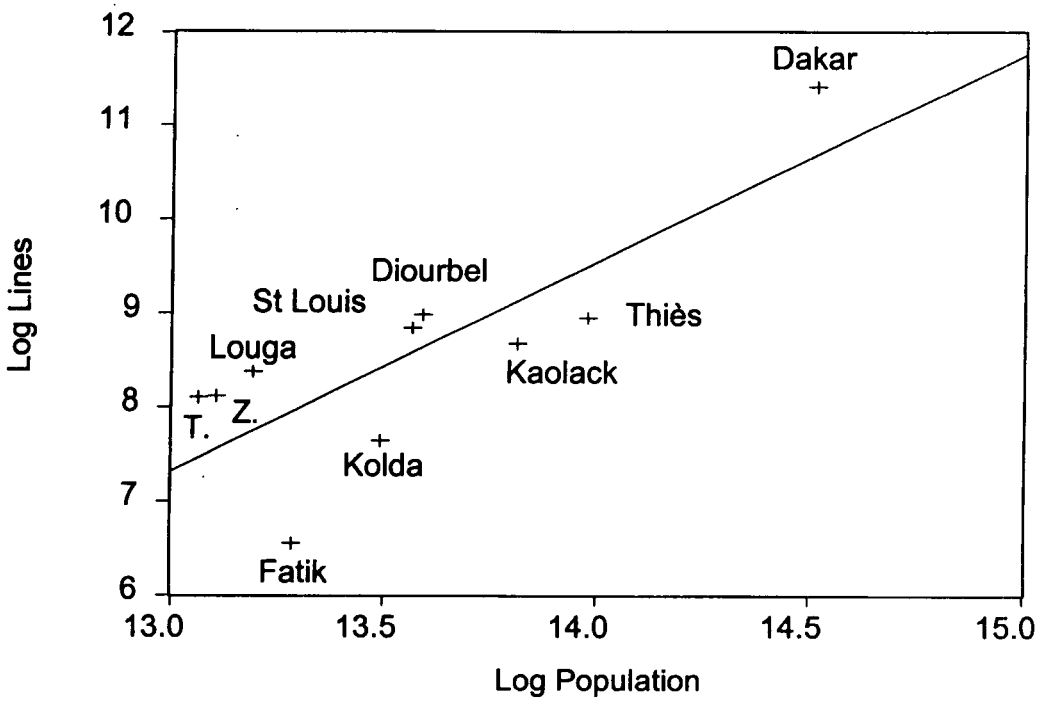
Table 2 : Main Lines per Region (31.12.1996)

Regions	Inhabitants	Urbaniza-tion Rate %	Number of Installed Mainlines	Mainlines Used (Urban)	Mainlines Used (Rural)	Density (Mainlines per 100 p.)
Dakar	2 012 303	96.6	91 214	66 084	239	3.3
Thiès	1 176 654	37.3	7 691	5 974	425	0.54
Fatick	588 563	11.9	704	561	112	0.11
Kaolack	996 807	24.6	5 84	3 160	196	0.34
Ziguinchor	491 434	43.1	3 352	2 032	74	0.43
Kolda	723 594	11.8	2 088	883	114	0.14
Tambacou.	470 800	17	3 306	1 440	158	0.34
Diourbel	798 054	21.9	7 980	2 855	3 707	0.82
Louga	535 968	18.4	4 334	2 863	311	0.56
St Louis	779 051	29.6	6 903	3 639	416	0.52
Sénégal	8 573 228	41.7	133 446	89 311	5 732	1.11

Source : Sonatel 28/10/1997.

The expansion in the number of lines has not taken place evenly across the different regions. The density of main lines remains in 1996 much higher in Dakar than anywhere else. Among the other regions, it is noticeable that the Diourbel region, which contains the city of Touba, the heartland of the Mouride religious brotherhood, has a high density of telephone lines relative to its urbanization rate. This comes out clearly from table 2 . Moreover, about 2/3 of the mainlines used in the rural sector are located in this same region. This reflects the political importance of the marabouts, who play a crucial part in maintaining political stability in the rural sector, in return for some patronage from the government (see Ka and Van de Walle, 1994).

Figure 1 : Number of Lines and Population per Regions
(Log Scale : Scatter Diagram)



Note : T. : Tombacounda, Z. : Ziguinchor.

However, this does not mean that the Diourbel area has been privileged in a massive way, as the allocation of lines across regions seems to follow a fairly simple rule, based on the size of the population of each region. This comes out quite clearly from the scatter diagram represented in Figure 1. The logarithm of the number of mainlines installed is here plotted against the logarithm of population size for each region, together with the simple regression line linking the two. It seems clear from this diagram that population size is the main determinant of the allocation of lines, up to some random shock, with an elasticity slightly above 2.2. Hence, although Diourbel lies above the regression line, it does not seem to be especially favored relative to Saint Louis, Louga, or Dakar. The number of observations available (10) precludes a more sophisticated econometric analysis.

Table 3 : Regional Distribution of Private Tele-Centers

	Number of Tele-Centers	%	Number of Lines	%
Dakar	1527	52	2154	59
Other Regions, Of which :	1407	48	1490	41
Thiès	309	11	319	9
Saint Louis	228	8	254	7
Louga	120	4	127	3
Kaolack	166	6	176	5
Diourbel	260	9	269	7
Ziguinchor	174	6	192	5
Tamba	150	5	153	4
Total	2934	100	3644	100

Source : Sonatel

Under the Sonatel monopoly, the number of public telephones expanded, either as payphones or as tele-centers. The former were about 270 and generated CFA 111 million of turnover. There are two types of tele-centers, managed either by Sonatel, or privately. The latter are by far the largest number, and generate 8 000 jobs. They are using 5 601 main lines, dealing in 1996 with 18 % of the total telephone bills, generating CFA 7.36 billion. Public telephones, and in particular tele-centers, are the main access to telecommunications by rural people. Table 3 shows the distribution of private tele-centers across regions. Despite the extension of the tele-centers outside of Dakar, and in particular in the areas of Thiès, Diourbel, and Saint Louis, Dakar remains the main beneficiary of the tele-centers activity.

Improved Service

The quality of service has improved to some extent during this decade, as the rate of successful phone calls has increased from 47 % to 50 % for local calls, and from 25 % to 45 % for inter-city calls. However, these figures remain much below the international norms of the ITU, which specifies 70 % as the target for local calls, and 60 % for inter-city calls. The network has become numerical at 90 % in the meantime. The tariffs had become relatively cheap by regional standards, and, for example, the price of an inter-city call had become CFA F 300 for three minutes in Sénégal, and CFA F 595 in Côte d'Ivoire.

Sonatel also enlarged its scope of activity during the 1985-95 decade, by creating a number of new services. It provided some customers with specialized lines, tailored to their special demands, with a guarantee of transmission capacity and permanent access. There were 328 of these on December 31, 1996. In September 1988, the Senpac service was offered, for bulk data transmission. This network reached 560 lines in 1996, with 521 customers, 377 of them benefiting from direct access. The Videotex system was created in 1989, allowing to access many data banks from a Minitel, through the Senpac network or through a telephone line. Another Minitel system, Minitelnet, allowed customers to get connected directly to the French Minitel network. A local Internet access system was also created at the end of this decade. Just before privatization, in September 1996, Sonatel launched its numerical mobile telephone network Alizé, using the GSM system. Within a year, 5 500 customers were registered.

The Financial Performance

The expansion of the network, and the enlarged scope of activity, went hand in hand with an increasing financial performance of the Sonatel firm, as well as of its importance within the Senegalese economy. The turnover has trebled over this decade, from CFA 16.5 billion to more than CFA 60 billion, while the value added increased in the same proportion. Table 4 presents the results for 1994-1996. The increase in profit in the years preceding privatization is spectacular. It seems to be correlated with a fall in the number of employees and of employees per main line, not offset by a sizable increase in personnel cost per employee. Probably, the rise in wages and salaries and the fall in the number of employees

provided the right incentives for bringing about the rise in productivity, as predicted by efficiency-wage theory. Table 5 shows how the composition of the workforce was changed during these years, as the ratio of management and supervisory staff to skilled and unskilled workers increased.

Table 4 : Financial and Economic Results (Current CFA Million)

	1994	1995	1996	Average
Turnover	57 491	53 639	62 013	57 714
Value Added	51 714	46 553	52 872	50 380
Personnel Cost	8 276	9 223	10 287	9 262
Before Tax Profit	2 149	6 543	18 315	9 002
Personnel	1 854	1 786	1 467	1 702
Personnel per 1000 main line	26	22	12	20
Personnel Cost per Employee	4.46	5.16	7.01	5.54

Note : The non-comparable pre-devaluation data for 1987-93 are presented in the appendix.

Source : Sonatel, 28/10/97.

As a result of this expansion, the Sonatel firm has become a significant contributor to the country's GDP. Its value added accounted for 2.5 % of GDP in 1995. Of course, as usual with African national accounts, the latter figure must be taken with a grain of salt, as 30 to 50 % additional domestic product, generated in the informal sector and in parallel trade, is probably unrecorded in the official data. Interestingly, the number of employees went down during this period. From the high of 2030 that was deemed immutable in the 1986-89 contract, the staff fell to an average of 1 702 over 1994-96.

Table 5 : Personnel Composition in Sonatel

	1994	1995	1996	Average
Management	306	299	290	298
Supervisors	327	321	289	312
Others	1221	1166	888	1 092
Total	1 854	1 786	1 467	1 702
(1+2)/4 (%)	34.1	34.7	39.5	36.1

Source : Sonatel, 28/10/97.

Therefore, the restructuring that occurred in 1985 brought about quite a lot of improvements in the telecom sector of Senegal, with Sonatel achieving a performance record going much further than the initial requirements. Beside the probable efficiency-wage effect mentioned above, it is plausible that the presence of representatives from the consumer association Adeetels on the board of Sonatel, together with a free press eager to criticize the government and the public sector, provided the right incentives for these performances. However, it is against this background of relative success that the Senegalese government has decided to go one step further in the reform process, and to launch a privatization process by a decision taken in the Council of Ministers on June 25, 1995.

3. The Adoption of the 1995 Reform Package

The good performance of Sonatel relative to the pre-reform situation were not regarded in the government as sufficient for facing up to the challenge raised by the fast pace of technological progress in the telecommunication and information processing technology. This was the main explicit drive behind the reforms launched in the mid-1990s, the adoption of which were made easier by some political circumstances, as well as by the wind of reform that was sweeping across the African continent, and other developing countries. Additionally, the sale of public assets provided some welcome financing for the ongoing adjustment program.

The Government's Position

Figure 2 helps to understand the government's position. The maximum price that the resident firms are prepared to pay for each level of service quality (given the volume of activity) is represented by the concave increasing function. The concavity of the curve captures the idea that although each improvement in quality has some value for the firm, per unit of activity, its incremental value goes down as quality increases, and flattens out probably beyond some point. The maximum quality that can be found on the external market, at each price, is represented by the convex increasing curve. The convexity of the curve describes the fact that the marginal cost of improving quality increases rapidly, for a given level of technology, and that there is probably an upper limit to the quality of service that can be delivered at any price, at a point in time.

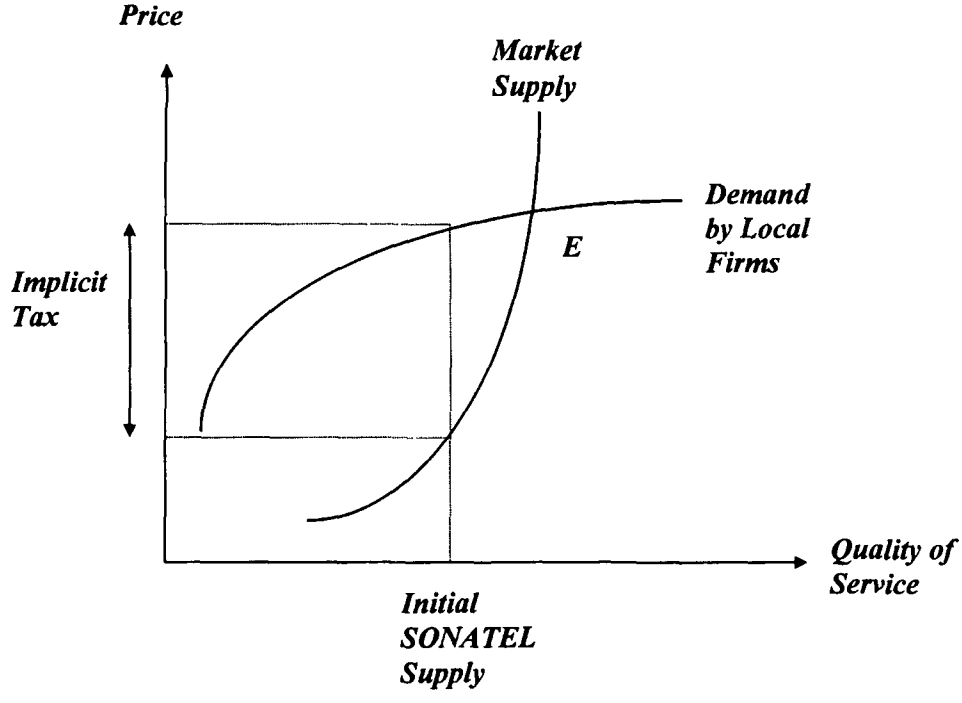


Figure 2 : Initial Equilibrium

The competitive equilibrium is located at point *E*, where these two curves intersect. However, in the initial (pre-reform) situation, Sonatel had a legal monopoly, and supplied a quality of service below the competitive level. As a first approximation, it can be assumed that

Sonatel was extracting all the rent from its customers in the firm sector, charging them the maximum price that they were willing to pay. Of course, not all the firms are equal, and in the real world, various firms have some bargaining power, and manage to get a discount relative to this maximum.

Hence, the vertical distance between the two curves at the initial quality level can be interpreted as an implicit tax, per unit of activity. Then, the willingness of the government to engage in the reform process can be thought about as the response to the fact that there is a maximum implicit tax that the firms are prepared to bear before they engage in lobbying the government and exert other types of pressure. If there is a fixed cost to exerting enough pressure on the government for lifting the monopoly right, then, the firms will be willing to invest this amount of resources whenever the implicit tax goes above some threshold, related to the present value of the implicit tax over some future period. Given this threshold, it is clear from figure 2 that the implicit tax could become too high if either the demand price by firms went up sufficiently, say under the pressure of globalization, or if the supply curve shifted out to a large enough extent, because of a positive technological shock. The third potential cause of increased implicit tax, namely the deterioration of the quality of service over time, does not seem to have been relevant in the case of Sénégal under the Sonatel monopoly.

However, the other two causes played some part in pushing the government to engage in the reform process, as the latter expected both the demand and the supply shifts to occur in the near future. The firms would additionally find some external support from International Financial Institutions, as the wind of reform had reached various other countries in the African continent, reducing probably the fixed cost of lobbying. Moreover, many firms in Sénégal are French, and the French community in Dakar has always been politically influent, and is said to have invested a lot in funding the dominant socialist party. Jean Collin, a Senegalese national of French origin has always been present in key positions in government, especially under Abdou Diouf's presidency (see Ka and Van de Walle, 1994). Therefore, the formal sector firms can be expected to have some political leverage. In order to keep Sonatel alive, with its staff and the various assets that it owned, the government felt the need to take action before the competitors exerted too high a competitive pressure.

Hence, there is a ceiling on the possibility of Sonatel to tax the multinational firms and other urban-based businesses, imposed by potential competition and the increasing bargaining power that the international situation gives them. As a result, the possibility of using the implicit cross-subsidy described above for funding the extension and the operation of the telephone network in the rural sector is limited, and some other source of funds is needed.

Moreover, the sale of government assets played a particular role in the Senegalese structural adjustment program. The Senegalese government owned a relatively large portfolio of productive assets, because of the policy of Senegalization that had been pursued in the wake of the commodity boom of the late 1970s (Azam and Chambas, 1999). Then, the world price of groundnuts and phosphates had increased abruptly, for a short-lived boom. Like many other African states, the Senegalese government had taxed most of the boom away from the producers, and used the proceeds to pursue its own agenda (see Collier, Gunning at al., 1999, for a series of case studies). Unlike some other African countries, Sénégal did not use all this money to increase massively public sector wages and salaries, or to engage in some other kind of politically irreversible increases in expenditures. Recognizing the expected transitory nature of the boom, the government rightly chose to invest a significant part of the windfall (Azam and Chambas, 1999). However, it did not choose any international liquid assets, or any completely illiquid public infrastructure, at least not massively, and opted instead for an extension of its public enterprise sector, effected in large part by a process of purchasing foreign firms, within a program of "Senegalization" of the economy. This made the subsequent recovery from the groundnuts and phosphate boom quite difficult, as productivity went down in most of these « Senegalized » firms, but had some longer-run financial benefits. This relatively large portfolio of productive assets gave the Senegalese government some room for maneuver when the time came of adjusting its economy and stabilizing it, enabling it to finance some of its reforms out of the sale of some of these assets. After a slow start, during the 1980s, Sénégal got actively involved in the adjustment program in the early 1990s (Rouis, 1994), and used the sale of its productive assets as a means to finance some public debt reduction, mainly after 1989 (Azam, 1997, Ka and Van de Walle, 1994). This provided an additional incentive to the government for privatizing the telecom sector.

The Other Players

The need to expand the coverage of the rural sector raises another problem for the government, as the marabouts, i.e. the religious authorities from the three brotherhoods present in Sénégal, do control the votes of the peasantry, and are pushing for a rapid extension of the telephone network in the rural areas. Ka and Van de Walle (1994) describe in some detail the roots of the marabouts' political power, and their connections with the dominant party system. Both presidents Senghor and Diouf have kept good relations with the marabouts, using them as a handle for social control, through the close links that they represent between the peasants and the rural elite, in return for public investment in strategic rural development projects, as well as the opening of various positions in the civil service and the public sector to some of the marabouts' followers. The government had gradually learnt the cost of keeping the marabouts satisfied. In the late 1970s, the financial disaster of Oncad, the parastatal in charge of the commercialization of agricultural products, among other things, epitomized the deleterious role of over-manning of administrative bodies within the political patronage system then in operation (Azam and Chambas, 1999). This disaster, in which the government had to take over a debt of CFA F 90 billions in 1982, after a protracted battle for dismantling this parastatal, had left painful memories to the leading politicians. After the democratization of the political system that took place in 1976, the political influence of the brotherhoods increased, because of their control over a large share of rural votes. They are widely regarded, especially the most numerous Mourides, as playing a determinant part in the outcomes of national elections, both presidential and legislative. Ka and Van de Walle (1994) provide examples of their involvement in the electoral battles, which illustrate their political power.

In this particular instance, the trade-off faced by the government was between extending the network in the rural sector, in order to please the marabouts, especially in the groundnut growing area where they flourish, versus keeping the control of a parastatal, with its reserve of jobs and privileges to be allocated to patron-client politics, but subject to various competitive constraints bearing on its expansion, as seen above.

Moreover, under the pressure of various vocal urban groups, the government made in 1993-94 an opening in the direction of the opposition parties. The charismatic liberal (pro-free

market) leader Abdoulaye Wade, who was to become president in March 2000, was then invited to join the government in February 1995, as Minister of State, where he stayed in office up to 1997. Beck (1999) provides an interesting discussion of the « enlarged presidential majority », that ruled the country over that period, arguing that its main impact was to divide the opposition, while attracting two out of the twelve or so opposition parties in government, by giving them access to political resources for enhancing their ability to distribute patronage. President Diouf was thus aiming at calming down some relatively pro-active opposition groups, including the students and some trade unions opposed to the policies pursued by the dominant socialist party, in power since independence. Wade's presence in the government was widely perceived as a means to secure some transparency and accountability for the government's policy, and thus as a protection against the corruption that voters were denouncing. This move reduced significantly the political weight of the accusation of selling off the state's assets at a cut price, which was the mainstay of the dominant trade unions position on privatization. Hence, the trade unions coalition inside Sonatel, which was resolutely opposed to privatization, lost part of its bargaining power at that time.

The Sonatel inter-union official position was mainly based on their opposition to the privatization of a highly profitable firm, with high technical performance, the best one in Ecowas, and their fears that the privatized firm would not comply with its public service obligations, including the delivery of telecom services to the non profitable rural areas, and would cut the number of jobs. However, they had lost the battle against the previous reform, mainly in 1983, and had kept vivid memories of the political cost of this defeat. Therefore, beside their traditional facade of resistance against privatization, the unions were in fact preparing a much more realistic line of defense, trying to get from the government the guarantee that : (i) they would be involved in the discussions about the privatization process, (ii) the current level of employment would be preserved, and, (iii) they would get a share of the capital. In fact, they launched several strikes for securing these three points.

They were joined by the customer's associations, which had been represented in the board of administrators of Sonatel ever since the 1985 reform. Adeetels, which represents the consumers in the sector of public utilities, is a subsidiary of the international network

Consumers International, whose regional office for Africa is located in Dakar. The other consumers association, Ascosen, is a general-purpose association. The consumer's representatives were expecting that privatization would deprive them of their representation at this level, as shareholders only could be represented after that change. They were afraid of moving from a public monopoly to a private one, on the grounds that the latter would be even less responsive to consumers' pressures.

An important supporter of the privatization process was the GRCC (Groupe de réflexion sur la compétitivité et la croissance). This state-financed reflection group was working with independent experts, and used to invite many representatives of the civil society to participate in its debates. They held two seminars on the reform of the telecom sector where the decisions to privatize and to liberalize were discussed. Representatives of the Entrepreneurs' union and of different workers unions, of the Ministry of Finance, as well as journalists and experts, were invited. Whereas the first of these seminars turned sour, the conclusions of the second one were very much in favor of the privatization and the liberalization of the sector (GRCC, 1995). This reflected the progress being achieved by the idea of privatization among the elite.

4. The Privatization and Liberalization Process

On February, 22, 1995, the National Assembly has voted the law that laid the ground for the privatization process. The monopoly right is taken away from Sonatel, and a broad framework is chosen for organizing competition in the sector. The act distinguishes three levels of operations : (i) in the so-called "value added sector", more or less free competition is allowed ; (ii) in the cellular phone sector, the plan is to have "organized competition", while (iii) the monopoly is kept for the fixed lines operations, although there was a debate about whether the entry of a second operator would improve the performances of the sector. An internal document called "déclaration de politique de développement des télécommunications" is then circulated, which announces that within a four year horizon, the rural communities would be connected to the network, Sonatel would be privatized, and the cellular phone market would be liberalized. The call for tender is published in 1996.

The Privatization of Sonatel

The privatization process was overseen by a special committee, the "Commission de Pilotage de la Privatisation de Sonatel", with representatives from the Ministries of Defense, Home Affairs, and Finances, from the Prime Minister and the Presidency, as well as from the Sonatel company itself. The National Assembly voted the Privatization Act, and the process had to take place in three steps :

(i) sale of the strategic bloc (33.33 %) ;

(ii) sale of the shares to the employees (10 %) ;

(iii) public sale of the remaining shares (17.66 %).

The Senegalese government was to keep 34 %, while the remaining shares (5%) were kept for an African operator to be determined[2].

A French Bank, the CCF (Crédit Commercial de France) was in charge of evaluating the offers for the strategic bloc. Its contract involved a fixed fee augmented by a percentage of the sale value.

Two companies were bidding, France Telecom, on the one hand, and a consortium dominated by the Swedish firm Telia, and including a Senegalese businessman operating in Britain. It seems that the government was seriously willing to avoid France Telecom, in order to avoid extending the influence of the former colonial power.

At first, the Scandinavian company Telia won the auction, for the Consortium. It acquired the monopoly right up to the year 2003, with the objective of having 400 000 main lines by that time. Then, competition was supposed to be opened. However, this consortium ran short of capital, and failed eventually to mobilize CFA 70 billion that it was supposed to get from the credit market. Moreover, it wanted a short concession (seven years), with a view to be able to pull out easily, while the Senegalese government wanted a longer term commitment (20 years), in order to provide better incentives for fixed capital investment, as the latter was making the extension of the network in the rural sector a priority.

Eventually, France Telecom won the bid, and got essentially the same agreement as the Telia-led consortium, the so-called "7 accords". The main difference was that the business plan was running up to 2005.

Neither the government, nor the strategic partner (France Telecom) does control the administrative board of Sonatel. The new board is comprised of four administrators representing the state, including one from the military, four also for France Telecom, while the last member represents the insiders' labor union, for reasons presented below. Therefore, any strategic decision has to be based on a consensus between the government and France Telecom. Nowadays, France Telecom has in fact acquired 9 % more shares.

Moreover, France Telecom gets a management fee for running Sonatel. It is based on the growth of operating profits which, in view of the price stability prevailing in the CFA zone, provides an incentive to expand the network in profitable areas.

The trade unions inside Sonatel fought hard to get their share of the pie. Initially, they demanded 25 %, and the possibility for them and other nationals to buy the shares at a 10 % discount, as well as some credit for them to buy their reserved shares, plus a series of minor demands, like a national debate for selecting the strategic partner. The first offer by the government was three percent of the shares, and a series of strikes resulted. At the end of the latter, the president chose to give them 10 %, with a 45 % discount. Moreover, these shares were not salable for three years, while the unions wanted a period of non tradability of five years. As the shares were sold CFA F 19 500 to the employees, the unions had to find CFA F 19.5 billion to pay off the state. The implicit 'present', entailed by the 45 % discount is thus about CFA F 16 billion. They collected one billion, and organized a company, the STE (Sénégalaise des Télécommunications) for managing the employee's savings. Moreover, they used their accumulated retirement funds (about CFA F 2.5 billion). The remaining sixteen billions were to be advanced by the state at zero interest rate, to be reimbursed from the dividends. In fact, the employees obtained the zero rate of interest after a strike. The distribution of the shares among the employees was based on the cash invested, on the retirement provision engaged, and then, on the state loan, with a positive correlation with the amounts willingly invested. Some employees did not get any shares, as they did not wish to invest in Sonatel, but some provision were made for reserving shares for future recruits.

The main benefit of this grouped 10 % shares in the STE was the possibility of getting a representative in the administration board. In order to keep this advantage, the STE

organized a system for buying internally the shares of the employees who wanted to sell them. On the other hand, the dividends turned out at times not to be sufficient for reimbursing the state loan, so that the employees had to save out of their salaries and bonuses. However, the unions are not represented in the board of Alizée, the Sonatel-subsidiary cellular phone operator, on the grounds that Sonatel as a whole is represented. Some union action is planned on this point. The unions have also created a link with the consumer association that was previously represented on the board, inviting them at their meetings in order to keep the relevant information flowing, and to get their support when needed, e.g. when they go on strike.

Moreover, the privatization program involved some downsizing. Initially, this was to be limited to voluntary quits. However, this turned out to fall short of the requirement, and the management provided some additional pecuniary incentives to quit, and a total of 480 people accepted to go, many of them from the declining departments, like the telegraph. The unions had prepared a set of accompanying measures, like the creation of small businesses for sub-contracting with Sonatel, some re-training activity, etc. But only 40 employees took some training before leaving the firm. Probably, the absence of industrial action against the downsizing is a favorable by-product of the workers acquisition of a share of their firm, giving them a stake in improved productivity.

The Liberalization of the Cellular Phone Sector

While the Ministry of finance was overseeing the privatization process, the Ministry of Commerce was in charge of the liberalization process for the cellular phone sector. Sonatel had created its cellular department called Alizée, just before being privatized. The call for offers was published very fast, and eight candidates put up a proposal (Comsat, CAT, Vodacom, International Wireless, Telecel, ATM, ...). It was not an auction, as the price of the license had been fixed, based on the case of Côte d'Ivoire and a study mission in Canada, and the choice between applicants was to be made on a score list. The application file contained a task list (cahier des charges), an evaluation form, a bank guarantee for FF 100 millions, plus FF 500 000 for the task list. Two non credible candidates dropped at that point. The competition was run in a transparent way, under the special attention of the presidency. This

was due both to the fear that the press would again denounce corruption, and to the pressure by the US embassy to avoid that a « present » be made to the French. Sentel, a subsidiary of the US company Millicom International (whose headquarters are in fact located in Luxembourg), won the competition for the second license, but took a year to start its operations, after buying its license, for lack of initial capital. In the meantime, a boom on the cellular phone occurred, such that about 50 000 users were registered by 1999. The opening of a third license, while being mentioned, was not precisely on the agenda at the end 2000.

Although some precise engagement was required from the bidders, with penalties explicitly planned for any deviations from the concession contract, some fuzzy points remained, and needed to be corrected later. For example, the important issue of interconnection tariffs was not part of the initial agreement, but came later, two years after the privatization. The discussion involved Sonatel, Sentel, and the ministry. This illustrates that there seem to exist some re-negotiation clauses in the concession contract. Similarly, it took some faith on the part of Sentel to expect that no cross-subsidies would be given by Sonatel to provide a competitive edge to its cellular subsidiary, Alizée. In fact, the legal framework governing the relationships between Sonatel and its cellular phone subsidiary Alizée has only been effective on October 1, 1999. The regulatory framework for controlling the sector has thus remained in a state of flux for awhile.

The Regulation of the Sector

While the creation of the Telecom Regulation Authority, called the ART (Agence de régulation des télécoms) has been on the agenda for a long time, the Ministry of Commerce is the acting regulator, as the legal creation of the ART, although ready on paper to be presented to parliament, has been resisted by a powerful interest group. It was expected that ART would become operational during the first term of the year 2000, but this has been postponed. The Ministry of Commerce, through its recently created 'direction des études et de la réglementation des postes et des télécommunications' (ERPT), is thus in charge during the initial period of overseeing the compliance with the concession contract, and has to face the unplanned issues. For example, it had to manage the debate over interconnection tariff, where the demands by Sentel were regarded as too high, and the Ministry of Commerce eventually

sided with Sonatel, which provided some estimates of the true cost. These inter-connection agreements are meant to be revised every two or three years. Table A.3 in the appendix presents the current level of interconnection charges. Moreover, this direction of the Ministry has very few technical means of its own, so that it sub-contracts most of its controls to technicians from Sonatel. Sentel has to get prior approval for some of its investments. There are complaints by Sentel that this is a source of inside information leaking to Alizée, the mobile-phone subsidiary of Sonatel, which has been able on some occasion to anticipate some strategic decisions of Sentel's, regarding in particular the location of some transmitters. This Ministry will remain in charge of presenting to the government any legal text proposed by the ART, if and when it is created, through a new direction, replacing the direction ERPT. This replacement is still to come.

The ART is planned to generate its own resources. The payment for the agreement with Sonatel, for the licenses, and various levies on licenses, on frequencies, etc. are paid in a special account at Sonatel. Moreover, it is to be funded by a 2 % turnover tax, the proceeds of which are to be directly paid in the ART special account, when the latter is operational. Part of this tax is also intended for funding research. The surpluses of the ART should be used as additional funding for the expansion of the network and the pursuit of the objective of universal service.

In the current version of the project, the regulatory authority is planned to be based on a college of three regulators, comprised of technical experts and judges. The former are to be selected among former Sonatel employees by the president, among those proposed by the Minister and the members of the economic and social council. The collegial nature of the ART is meant to minimize the risk of capture, while the fact that all its members are civil servants is claimed to offer an additional guarantee of 'moral probity'. The members are to be in place for three or six years, renewable in turn, and cannot be dismissed. In case of disagreement, the Minister has no power of last resort arbitration. In fact, the International Chamber of Commerce of Paris is the ultimate authority in such a case. The secretariat of the ART is to be provided by a Director General, and an administration board to oversee its operations. There is no representative of the consumers associations. However, this regulatory

framework is still waiting to be voted. During the winter of 2001, a competing project has been devised, aiming at creating a multi-regulation agency, which would regulate all the public utilities.

As of October 2000, there were two licenses for the cellular phone, three licenses for paging, three also for trucking, about ten for the Vsat network (data processing : World Bank resident mission, BCEAO, etc.),... While the monopoly has been kept over the access node for the Internet, the Internet service is entirely liberalized ; The fixed lines, and the wireless local loop are under the Sonatel monopoly until 2003.

The tariff policy is based on price caps, but of a very flexible kind, in order to allow for revisions. The initial caps have been discussed with the operators. For example, the price cap on the base tax is CFA F 80 for local calls, while the actual price is CFA F 50. In other words, the cap is not binding, so that the tariffs are basically unregulated. However, there is a clear policy of lowering progressively the charges on international calls, with a view to align gradually the tariffs on the costs. The proclaimed policy is that this gradual move is required before opening entirely the network to competition. As shown below, this price cut was effected after privatization.

5. A Preliminary Assessment

The impact of the privatization of Sonatel seems to be positive, as predicted, in view of the first three years of operation. However, the results of the liberalization process in the mobile phone sector seems more difficult to assess, and raise interesting issues, that are discussed in a second point.

The Results of Privatized Sonatel

Table 6 provides the major financial indicators describing the activity of the privatized Sonatel company. There is a marked improvement over the 1994-96 average performance presented in the first column, as far as turnover and value-added are concerned, while this firm has spent more on factors of production, increasing both its personnel cost and its investment outlays. While turnover has nearly doubled in 1999, relative to the 1994-96 average, value added has increased by more than 50 %. This marginal squeeze in value added

reflects probably to some extent the increased relative price of imported inputs due to the 1994 devaluation of the CFA franc. In the meantime, the investment effort has been multiplied almost by a factor of 4. At the end of 1999, the Sonatel shares accounted for about 25 % of the capitalized quotation in the regional stock exchange of Abidjan.

Table 6 : Financial Performance of Privatized Sonatel (1997-99)

	1994-96 Average	1997	1998	1999
Turnover	57.7	80.1	90.7	103.5
Value Added	50.4	57.1	74.0	79.7
Personnel Cost	9.3	9.8	11.6	13.0
Investment	16.9	21.3	40.0	54.6

Source : Sonatel 2000

Table 7 : Quantitative Performance Indicators of Privatized Sonatel (1997-99)

	1994-96 Average	1997	1998	1999
Main Lines Used	84 025	115 902	139 549	165 874
Alizée Subscript.	-	7 000	22 110	73 472
International : In	-	68.9	94.0	111.0
(million min.) Out	-	27.6	31.7	36.5
Personnel	1 702	1 346	1 070	1 052
Productivity	49.4	86.1	130.4	157.7

Source : Sonatel 2000.

Table 7 provides some quantitative performance indicators, describing the expansion of the scale and efficiency of operation of Sonatel. The number of main lines used has almost doubled in 1999 relative to the 1994-96 average, while the number of employees has been cut by more than a third, entailing a near trebling of productivity. Moreover, the expansion of the use of international phone calls is measured in lines 3 and 4, in terms of million of minutes, showing a faster increase in the number of calls from abroad than from the country.

In the meantime, Sonatel has cut its prices, and improved the quality of service. Connection charges have been cut by 50% in July 1998, from 87 700 CFA F to 43 900 CFA F for an ordinary line. By enlarging the definition of local communication zones, it has also reduced the cost of a call between two departments of the same region from 60 CFA F for 45 seconds to 60 CFA F for 2 minutes, on the same date. The minute of inter-regional communication has fallen from 80 CFA F to 30 CFA F, a fall by 63 %. International calls have been reduced on several occasions: a cut of 10 % in February 1998, 15.5 % in December 1998, 10 % again in July 1999, and 8 % on January 15, 2000. Therefore, it seems that Sonatel has now reached a fairly elastic part of its demand curve, and must cut its prices for expanding the size of its operations. On June 6, 2000, a further series of cuts was made regarding international calls, including the creation of a reduced charge for night calls and during the week end. This resulted in a fall by 25 % of the normal tariff, and a cut by 50 % for the night and week end calls. The resulting charges are much below those of other African countries, For example, the cost of calling Senegal from Mali and Côte d'Ivoire were respectively 700 CFA F and 535 CFA F per minute, while the price for a call in the reverse direction was only 283 CFA F in normal time, and 170 CFA F at the reduced tariff (all these are before tax). The cost of calling France from Sénégal was then less than half the cost of calling France from Côte d'Ivoire (425 versus 900 CFA F); the cost of calling the USA was three times lower (442 versus 1400 CFA F).

Moreover, the commercial policy of Sonatel was not only based on cut prices, but also on improved quality of service. For example the fraction of faults repaired within two days reached 89.88 % in 1999, and the fraction repaired within eight days reached 99.73 % the same year. The rate of successful calls was 32.7 % for international calls, and 64.79 % for local calls.

However, this expansion in the size of operation was achieved without any significant gain in total factor productivity, when the latter is measured in terms of constant price value added, rather than by the number of lines per employee, as done above at table 7. This comes out clearly from the following exercise.

Chart 3 : Real Turnover and Real Value Added per Worker
(log scale)

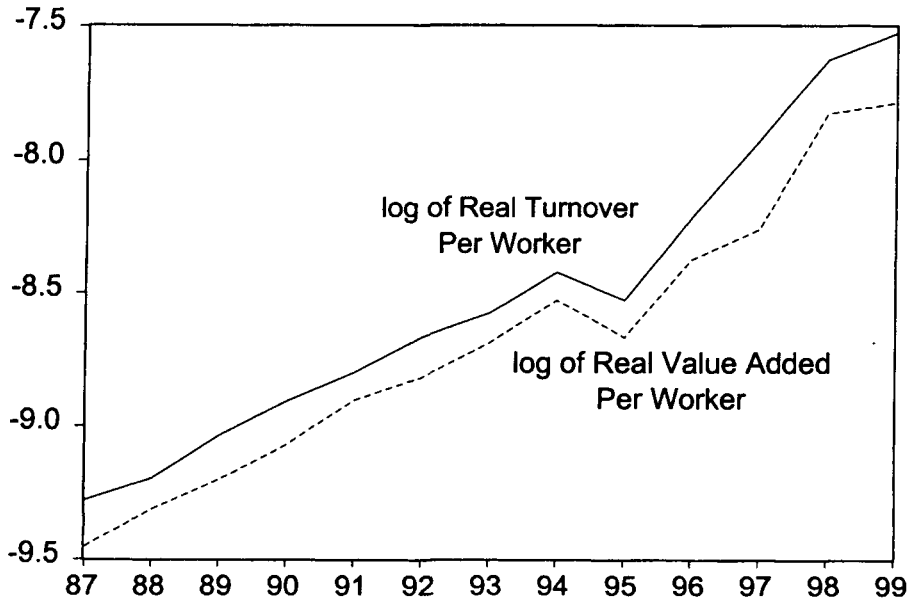
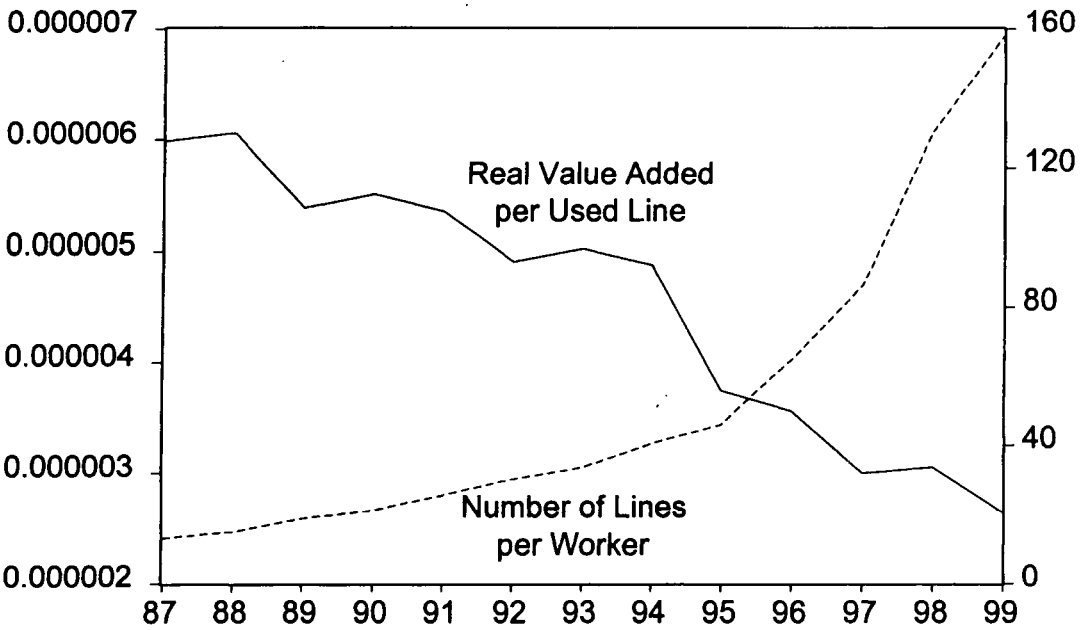


Chart 3 presents both the logarithm of the real turnover per worker and real value added per worker, both computed by using the GDP deflator, over the period 1987-1999. Their growth is impressive over the whole period. There seems to be a downward shift in both series in 1994, suggesting that the impact of the 1994 devaluation of the CFA franc on the price level was not passed on proportionately by Sonatel to its customers. Then, from 1995 up to 1998, both series show a steeper trend, suggesting that privatization boosted labor productivity, while this acceleration effect seems to stop in 1999, the growth rate going back to its previous level. However, this latter point needs to be confirmed in the years to come. Chart 4 suggests that this gain in labor productivity over the previous trend was obtained by substituting used lines for workers. It shows that the expansion in the number of lines per worker was stepped up after privatization, while the downward trend in value added per line became somewhat steeper. Therefore, it seems that France Telecom has pushed the privatized Sonatel to adopting a more capital-intensive technique of production, probably because it provided a better access to the capital market than the state-owned Sonatel ever had.

Chart 4 : Real Value Added per Used Lines and Number of Lines per Worker



Using these data, and regarding the number of lines as a rough proxy for the capital stock, one can estimate a simple Cobb-Douglas production function, by ordinary least squares, keeping in mind that the small number of observations imposes to be extremely cautious about the results. In log-linear form, the estimates are[3] :

$$log[\text{Real Value Added}] = -12.83 + 0.50\ log[\text{Personnel}] + 0.71\ log[\text{Lines}],$$
$$\qquad\qquad\qquad\qquad (6.08)\quad (2.72)\qquad\qquad (9.69)$$

$N = 13$, $R^2 = 0.96$, D.W. = 2.23, $F(3, 10) = 113.89$, Chow-$F(4, 9) = 1.62$.

The number of observations is noted N, and is admittedly rather small. The fit is apparently very good, as usual with Cobb-Douglas functions. There is no significant residual autocorrelation, according to the Durbin-Watson statistics. The Chow test addresses the issue of coefficients stability, before and after 1996, and suggests that there is no significant shift in the production function in 1996, implying that the main impact of privatization has been the change in capital intensity brought out above, rather than any significant gain in technical efficiency. The t-statistics reproduced in parentheses below the estimated coefficients are

White's heteroscedasticity-consistent ones, and suggest that all the estimates have a pretty low standard error. Lastly, as expected for a network industry, we find that the returns to scale are increasing, as the sum of the coefficients of labor and number of lines adds up to 1.21. Moreover, the number of lines is an imperfect proxy for the capital stock, and the implied measurement error should bias the estimated coefficient downwards. However, one should keep in mind that the sample size is very small, so that the results must be regarded as suggestive, rather than firmly established. Nevertheless, they suggest that the main impact of the privatization process was the adoption of a more capital-intensive technique of production, with an accelerated expansion of the network combined with a cut in manpower. No significant gain in total factor productivity seems to have occurred, besides the economies of scale. This is confirmed by the following alternative test, where *D*96 is a dummy variable taking the value 1 from 1996 on, aiming at capturing the impact of privatization[4] :

$$log[\text{Real Value Added}] = -10.82 + 0.24\ log[\text{Personnel}] + 0.71\ log[\text{Lines}] - 0.13\ D96,$$
$$\qquad\qquad (6.08)\quad (0.83)\qquad\qquad (8.37)\qquad\qquad (1.16)$$

$N = 13$, $R^2 = 0.96$, D.W. = 2.77, $F(4, 9) = 79.01$.

The dummy variable *D*96 has a negative impact, but is not significant. Its inclusion affects significantly the estimated coefficient of *log*[Personnel], suggesting that these two series are negatively correlated over this sample. Hence, this equation provides some additional support to the diagnosis expressed above.

Nevertheless, the newly elected government decided in October 2000 to revise the task list of Sonatel, without negotiation, in order to step up the expansion of the network in the rural sector (Dieng, 2000). The government has replaced the objective of connecting 1000 additional villages by the end of 2002, by the target of 7000 villages by the end of 2005. According to Samba Sene, Sonatel's Network Director, this could by no means be achieved even in a decade (interview to *Le Journal de L'Economie*, N° 236, 0ctober 23, 2000). With the current fixed line technology, Sonatel claims to be able to connect about 100 villages per year, and 650 villages are connected at the end of the year 2000. The emerging agreement between the government and Sonatel seems to be (as of end 2000) to open that segment of the

market to private operators (Globalstar and others), who would invest using the new wireless technology. However, this attempt by the government at renegotiating the privatization contract by imposing new objectives seems mild relative to the action taken against Sentel.

The Sentel Shock

The most important event that took place in the aftermath of this privatization-cum-liberalization episode was the withdrawal of the license of operation of Sentel by the government in October 2000, a license that had been granted only on July 3, 1998. This occurred in the wake of 'Sopi', meaning 'the change' in the Wolof language, a word which has become a symbol all over Francophone West Africa.

In March 2000 the socialist government which ruled the country ever since independence was unexpectedly defeated in the general elections, and Abdoulaye Wade became the new president. The defeat was a surprise to many observers, because it showed that the elections were not as rigged and manipulated as many believed, and the Senegalese people are rightly proud of it. In fact, in the post-election period, presidents Wade and Diouf made several gestures to show that the change was effected in a perfectly democratic climate, with Abdou Diouf being invited by president Wade to represent Senegal at the OAU summit, for example. The main argument that seems to have won the voters preferences was the fight against corruption. Diouf's last Foreign Minister, Moustapha Niasse, together with some of his followers, left the ruling socialist party, and founded the 'Alliance des forces de progrès'. Their political line is to be the 'anti-corruption socialists'. Between the two rounds of the election, they reached an agreement with the pro-market 'parti démocratique sénégalais', the party of the historic opponent, and main pro-market politician, Abdoulaye Wade.

After 'Sopi', as Wade became president, many socialists started to quit the defeated socialist party, nicknamed the 'transhumants', to join either Niasse's forces, or the president's party. President Wade soon realized that the image of the newly elected coalition was rapidly changing in the public sentiment, partly in favor of the prime Minister's party, but also negatively, a bit like 'old crooks wearing new clothes', as many politicians of the previous regime reappeared in prominent positions in the new coalition. He thus felt under pressure to take a major initiative on the anti-corruption front, the wining theme of the elections. As the

privatization process had attracted a lot of attention during the electoral campaign, the previous government being widely accused of selling off the 'country's assets' at a bargain price, it naturally provided a privileged battle field for a major political move. The first 'victim' was the Senelec company, the power company that was privatized in 1998. The Elyo company, a subsidiary of the French Company Lyonnaise des Eaux, had bought jointly with the Canadian company Hydro Quebec International, 35 % of its capital. Its license has been withdrawn at the beginning of October 2000. The main accusation by the Senegalese government was that it had failed to even spend the first franc on the promised investment program.

Another private firm, in the chemical sector has also been under attack, the 'Industries Chimiques du Sénégal', a multinational firm, with mainly Indian and Senegalese capital. The government has attempted to remove the General Director of this firm, Pierre Babacar Kama, a move that lies beyond its legal power. This is regarded as a personal affair of the president. The Indian investor resisted this government intervention, and seems so far to have been vindicated.

Then came the turn of Sentel. This decision was announced on October 12, 2000 by the Council of Ministers, while the Minister Mamadou Diop Decroix was away (*Le Sud*, October 12), and his cabinet seemed unable or unwilling to explain this decision to the media. The general director of Sentel, Youval Rosh was also away, attending the Millicom International annual conference of its mobile phone operators in St Petersburg, which was also attended by the president of the Sentel board of administrators, Pape Abdoul Ba. On many occasions before this, the President had complained that the price paid by Sentel to acquire the license, CFA francs 50 million, was very low compared to some other countries, as well as the annual payment of CFA franc 50 million. He mentioned the case of Morocco, where the cheapest license had been auctioned off for CFA francs 1.5 billion, on October 9, during a meeting with representatives from the 'Front de l'Alternance', the organization which had been active in consolidating the wining coalition. Then, he complained about this, and mentioned the conditions in which the series of privatization in general took place in Senegal, and was very vague about the Sentel license, when asked about it. At the end of the meeting,

he said : 'it's over, we are going to withdraw'. One of his close advisors added : 'he is going to do it, even if there are penalties' (*Le Sud*, October 12). The decisive benchmark case seems to have been that of the mixed private Mauritanian and Tunisian society Mattel which paid more than CFA francs 19 billion (US $ 28.5 million) for its license, and then invested more than CFA francs 35 billion, while Sentel's investments have been difficult to know at that point, but are now claimed to be one year ahead of schedule, an easily verifiable claim. The case of Sentel was made difficult by the fact that no part of the contract signed between the government and Sentel has been circulated, even on a restricted basis, which aroused a climate of suspicion. This is true also of the agreements concerning interconnection charges, that was reached only after the sale of the license. Moreover, the fact that Sentel was operating only on a pre-paid basis, and not with a regular subscription system, was regarded by many as an indication that it was not planning to spend much for acquiring a secure position in the market. Nevertheless, Sentel had attracted 45 000 subscribers at the time of this decision, and a transitory phase has been granted by the government, where Sentel is allowed to operate without a license. It was then announced that a new round of negotiation would be opened, for an undefined period, at the end of which the license would be sold again, probably by auction. Sentel was to be compensated for its investments, at a price decided by an independent expert, accepted by the two parties. However, the government complained about Sentel not having followed the planned procedure of agreement for all its choice of equipment, in agreement with the concession contract, and wanted to use this in due course as an argument against Sentel.

After the Minister of Communication, Mamadou Diop Decroix gave a press conference on October 16, giving more precision about the government's reasons for this decision, the Sentel company circulated a response, contesting most of the government points. One excerpt from this response is worth citing. A precise point in the Minister's communiqué claims that Sentel had not paid the amount required for the use of the GSM channel, i.e. CFA F 50 million per year. He mentioned a series of other points, including some other payments that Sentel had failed to effect. The response by Sentel epitomizes the problems raised by a privatization process performed in a weak institutional environment : "Sentel has paid this

levy and has delivered the amount [...] 187 500 000 CFA F in the account indicated in the letter signed by the Minister of Culture and Communication dated 10/07/2000 under the ref. 01367 - MCC/IT". Apparently, the government had never seen this money, although it was paid on the Sonatel account at the BICIS. No judicial verification of this, and other payments claimed to have been effected by Sentel, seems to have been done before the decision to withdraw was imposed. Many other examples of contradictory claims are made by the two sides, while the decision seemed irreversible. Although no expert has been sent by the government to verify Sentel's claims, it seems that their response is based on easily verifiable information. Among others, the French and the US embassies have responded swiftly to the announcement of the withdrawal of Sentel's license, the US State Department expressing openly some serious concern, while the French Foreign Affairs Ministry condemned this action immediately. The government's case turned out to be pretty weak, as its allegations of 'heavy faults' were easily refutable, so that a phase of negotiation about a financial compensation started.

Some additional light on these events is provided by a technical factor, namely that Alizée and Sentel together are occupying more than 90 % of the 900 band, so that the sale of a third license would have a low market value unless it went into the 1800 Mhz spectrum, which requires more expensive investments. In fact, Sentel had purchased 2 × 12.5 Mhz, or 64 channels, while Alizée had bought 2 × 10 Mhz, or 50 channels. The remaining spectrum space was 2 × 2.5 Mhz, not enough to support a third operator acting only in the 900 band. Hence, preventing Sentel from operating could be seen as a potential way of increasing the value of a possible third license, if the sale of the second one (Sentel's) was precluded until the judicial process came to a close.

A new debate had been open for a while in governmental circles about the first license bought by Alizée for 1 symbolic franc, according to some sources, just before Sonatel was privatized. Others claim that the Alizée license was simply included in the Sonatel package that was privatized, and for which France Telecom paid CFA francs 70 billion for its share. On October 16, the Minister of Communication Mamadou Diop Decroix announced that a denunciation of the contract with Sonatel was not impossible. Many remember that the

director of Studies and Regulation at the Ministry of Communications, Cheikh Tidiane Diongue, had then offered his resignation to the Minister, Sérigne Diop, because of an irregular procedure having been pursued for transmitting the submission files to the applicants for buying Sonatel, resignation which had not been accepted. In a letter dated 14 August 1996, in which he complained about these facts, he declared facing 'a problem of conscience with respect to the values of honesty and the principle of transparency in which he believed', letter that was published by the newspaper *Le Sud*. However, the idea of taking some action against Sonatel has been dropped, considering that the current owner really bought the mobile operator company as part of the Sonatel package.

In April 2001, a settlement seemed to be in view. The 'heavy fault' charge against Sentel was dropped, and the latter would be given its license back, against a financial transfer. Moreover, Alizée would in fact be charged by the same amount. In other words, the government would eventually accept the status quo in return for a 'retrospective spectrum fee'. The sums required are not yet known. Moreover, the sale of a third license is under study, involving admittedly an expensive extension of the new entrant into the 1800 band.

Sovereign Contracts and the Fight against Corruption

This series of actions taken by the Senegalese government against newly privatized firms may be regarded by some as a legitimate action against corruption, while others would complain that the Senegalese government is undermining irreversibly its capacity to commit credibly to a contract with the private sector in the future. After all, Sentel's license has been withdrawn unilaterally, while the legal regulatory agency, the ART, is still to be created, as the existing draft of the law has never been presented to the vote of the parliament. The 'Direction de la Réglementation' was the acting regulator, and should in fact have been left in charge of evaluating the breach of contract, and of applying the appropriate sanctions. However, it has only been involved in the decision peripherally, on its own admission, and the government has over-ruled all the existing procedures. In particular, the International Chamber of Commerce of Paris has not been approached, although it was the designated authority for arbitrating any conflict. This illustrates vividly how difficult it is to sign a credible contract with a sovereign entity. One may even argue that the uncertainty surrounding the commitment ability of the

Senegalese government might have been instrumental in deterring the private companies from investing in equipment as much as planned, as the government was probably perceived as being unable to tie its own hands credibly. In particular, the investors might have assigned some probability to the change of government, while the new government was deemed unlikely to feel bound by the previous one's agreements. Under these 'hold-up' conditions, one may argue that the low (official) prices paid for the licenses, and other related expenses, was an equilibrium price, the discount granted implicitly reflecting the high probability of reversal of the sovereign contract, as vividly illustrated in another context by the debt crisis of the 1980s. This can be understood better with the help of the following simple model.

Because of the widespread sensitivity to the corruption issue, largely publicized by the debates over 'good governance' all over the world, despite its fuzziness, it is very likely that a government will very probably get away with a reversal of its decision to sell an asset to the private sector, if the price paid for it by the buyer is low. Such a move could even be regarded favorably in this case by the international community as a signal of the government's drive against corruption. An accusation of corruption would be less likely to attract the understanding of the international community if the asset had been purchased at a high price. Therefore, the government is likely to get away pretty well if it breaches a contract for the privatization of an asset that has been paid at a low price, whereas it is liable to get various forms of sanctions from the international community when reneging on a contract which has been paid at a price widely regarded as reasonable. Among the latter, a fall in the rating of the country as an investment risk is likely to be especially damaging. Hence, the government is more likely to breach a privatization contract when it has entailed a small (official) payment for it. This behavioral assumption is described by the curve $\pi(P)$ in figure 3, where π represents the probability of the government reneging on the privatization contract, and P the price paid by the buyer. Its S-shape captures the idea that there is a range of prices that seem 'reasonable', and below which the probability of a breach of contract increases rapidly, while above that range, the probability being already low, the odds are strongly tilted against reversal. However, because of the sovereign character of one of the parties to the contract, it is likely that this probability will remain significantly above zero at any price.

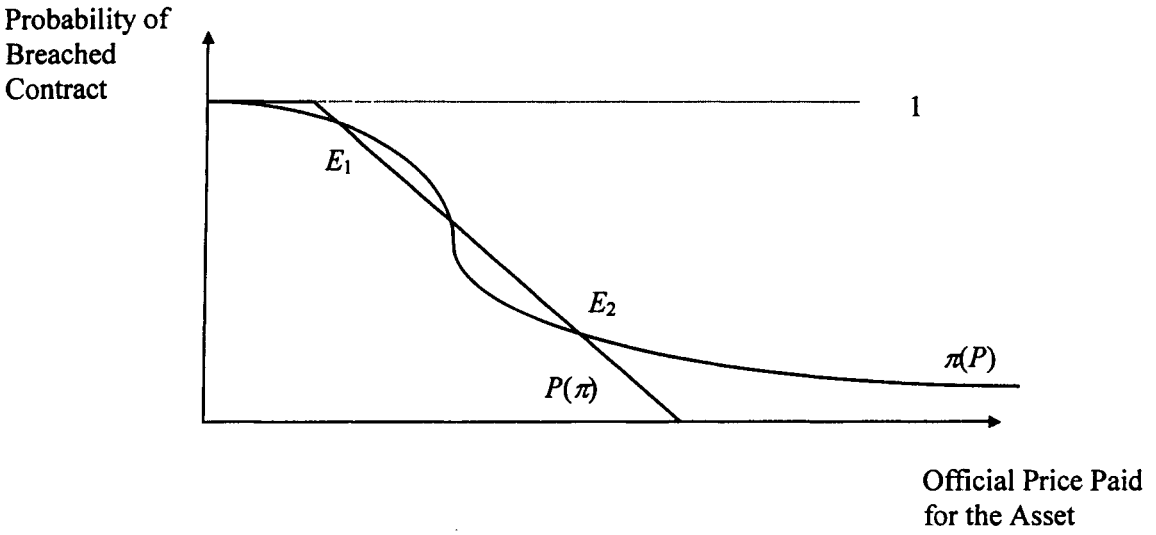


Figure 3 : Equilibrium Breach of Privatization Contract

Assume that the buyer has rational expectations, and is able to anticipate correctly, up to some random error, this probability. Then, it is sensible to assume that the buyer will be prepared to pay a lower price for the asset, the higher this probability. This behavioral assumption is captured by the $P(\pi)$ curve in figure 3, representing the price that the buyer is willing to pay as a function of the expected probability of the government breaching the contract. It has naturally a negative slope, as a lower probability of breaching commands a higher price, and it is drawn as a straight line for simplicity. However, two important points are captured by this curve : (i) there is certainly a maximum price that the buyer would be prepared to pay, even if the probability of a breach was to fall to zero, because the returns to the asset are finite, and (ii) the buyer is probably prepared to pay a positive price for the asset, even if the probability of breach of contract reaches 1, as the application of the international law, with the support of various international institutions, would probably result in some compensations being paid to the firm in the case where the government reneges. Moreover, the firm might be allowed to operate profitably for a while, before the breach of contract occurs. This determines one of the parameters of the model, that determines in turn the relative positions of the two curves.

In the case represented in figure 3, we have two stable equilibria, denoted E_1 and E_2. The former has a high probability of reversal, coupled with a low equilibrium price of the asset; the latter has exactly the opposite characteristics, namely a low reversal probability, coupled with a high price. No groping towards an equilibrium is required if the government has a satisfactory knowledge of the parameters governing the behavior of the two players, up to some random error, and the sale of the asset may be organized as a fixed-price 'beauty contest', as occurred in the case of the Sentel license. This reflects the 'eductive property' of rational expectations (Guesnerie, 1992). Notice that the E_1-type equilibrium is unlikely to exist if the required compensation for the breach of contract is credibly set high enough.

Then, in the low-price equilibrium, it is plausible that an investor who is aware of the high probability of the breach of contract will not engage in a high level investment program, whereas in the high-price equilibrium, the investor will rationally feel more secure, and will invest more. Therefore, as in the case of Sénégal, the low investment outlays by the firm may be used additionally by the government as an excuse for breaching the contract, in equilibrium. Therefore, the fact that the government is selling the privatized asset at a low price may be regarded as an inefficient equilibrium deterrent for the privatized firm to engage in any massive investment program, an hence as a brake on the expansion of the sector. This is a testable hypothesis, but its econometric analysis falls outside the scope of this paper, as it requires a large number of observations.

6. Conclusion

The analysis of the telecom sector reform process in Sénégal offers a series of interesting lessons about the political economics of privatization and liberalization. There was first a reform in 1985 that restructured the sector and created a public monopoly over the telecommunications. On a 'before-after' basis, this reform appears to have been a success, with a sizable expansion of the network, and a significant improvement in the quality of service. However, under the pressure of the potential competition available on the international market, these achievements were regarded as insufficient by the Senegalese government. The political elite was afraid of becoming unable to resist the possible lobbying by the multinational firms operating in Sénégal, were the public monopoly to fall too far behind the international standards of service. Then, a decade after the first reform, the government decided to privatize and to liberalize the sector, in order to keep it abreast with technological progress.

The public monopoly was partially privatized, with about 33 %, and then 42 %, of the shares sold to France Telecom. While the monopoly over the fixed line service was kept, two licenses have been delivered for the mobile phone segment of the market. Other services, like Internet operations and other 'value added' activities have been liberalized even further. The government had to give away quite a lot to the trade unions in order to get its project through. The workers thus acquired 10 % of the capital of the privatized company, which they kept grouped under the control of a new company that they created, the 'Sénégalaise des Télécommunications', in order to have a voice in the board. They bought their shares at a very concessional rate, with a 45 % discount and an interest-free loan. In terms of technical efficiency, the impact of privatization on Sonatel does not seem statistically significant, while the privatized firm expanded drastically the network, and substituted capital for labor.

Just before privatization, the Sonatel company got a license to operate a cellular phone department, which became a subsidiary shortly after. Then, a second license was issued, and sold at a fixed price to a subsidiary of the US company Millicom International, called Sentel. However, the price officially paid by this company was regarded as pretty low by the new government, which took over in March 2000, and this prompted the latter to withdraw the

license, without negotiation, along with other reversals in the privatization process elsewhere in the economy. Although covert, or implicit, accusations of corruption against the previous government are widespread, no judicial procedure seems to be planned to establish the reality of this matter. Out of an 80 pages contract, the Sentel company is bound to have breached some of the clauses, and its chances of reversing the withdrawal decision are nil. A new round of bidding was planned for a while to be opened for selling the license again. Eventually, it seems that the two mobile operators will simply have to pay a fixed charge to the new government, as the price for returning to the status quo.

This 'Sentel shock' provides an illuminating example of the risks incurred by a private party in contracting with a sovereign entity, which had been illustrated before vividly by the debt crisis of the early 1980s. A sovereign government might sometimes not resist the temptation to exchange a short-run political advantage for a longer-term serious problem of credibility, in order to increase its financial resources in the short run. However, a little game-theoretic analysis suggests that the 'victims' of this kind of governmental decisions to renege on past engagements are 'adult and consenting', in the sense that the probability of such a decision being taken is plausibly taken into account at the time of the purchase, at an equilibrium price. This is suggested by the fact that foreign firms seem to restrict investment when the price they paid for the privatized asset is too low. At least, the limited experience offered by the study of the Senegalese case, which contains only two instances, suggests this hypothesis, which deserves to be tested on a larger sample.

Notes

1. All the translations from the French are by Jean-Paul Azam, and have not been certified by the original authors.
2. Of course, gossip has it that these 5 % shares were reserved for cronies of the president, but it is impossible to verify this claim.
3. The results are almost identical when this equation is estimated by instrumenting the two inputs by their lagged value, despite the entailed loss of one observation in so doing. Similarly, the coefficient stability tests are almost identical when taking 1997 as the breakpoint.
4. Ibid.

Appendix : Pre-Devaluation Financial Data

Table A.1 : Pre-Devaluation Financial Results of Sonatel (1987-93)

	1987	1988	1989	1990	1991	1992	1993
Turnover	19.0	20.1	23.7	27.2	30.1	35.0	38.1
Value Added	15.9	17.9	20.1	23.1	27.1	30.1	34.1
Personnel Cost	na	na	na	5.2	5.8	6.7	6.4
Invest-ments	11.4	11.7	15.5	4.3	11.4	16.4	6.9
Personnel (Number)	na	1 942	1 933	1 937	1 913	1 927	1 910

Note : Current CFA F billion, except Personnel.

Sources : Sonatel, May 1995 and May 1996.

Table A.2 : Data for the Econometric Estimations

Date	VA	Defl	Person	Lines	Date	VA	Defl	Person	Lines
1987	15.9	100	2030	26548	**1994**	51.7	141.2	1854	75024
1988	17.9	102.1	1942	28933	**1995**	46.6	151.9	1786	81988
1989	20.1	103.1	1933	36166	**1996**	52.9	156.4	1467	95063
1990	23.1	103.7	1937	40413	**1997**	57.1	164.2	1346	115902
1991	27.1	104.3	1913	48469	**1998**	74.0	173.6	1070	139549
1992	30.1	105.5	1927	58095	**1999**	79.7	182.4	1052	165874
1993	34.1	106.0	1910	64055					

Table A.3: Inter-Connection Charges

	Normal Time	Nights and Week Ends
National		
Mobile to Fixed		
Local	23.6	14.8
Simple Transit	52	32.5
Double Transit	70.9	44.6
Fixed to Mobile		
Share of Fixed	65	40.7
Share of Mobile	101.66	42.63
International		
(expressed as % discount on Sonatel Charge)		
Mobile to International	- 11 %	- 8.5 %
International to Mobile	- 15 %	- 15 %

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